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# VandalForge - Software Team

Vulcan Team • Spring 2018

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# Overview

## Outline

- 3D Printing Process
- Objectives
- Requirements
- Alternatives
- Slic3r
- OctoPrint
- Summary

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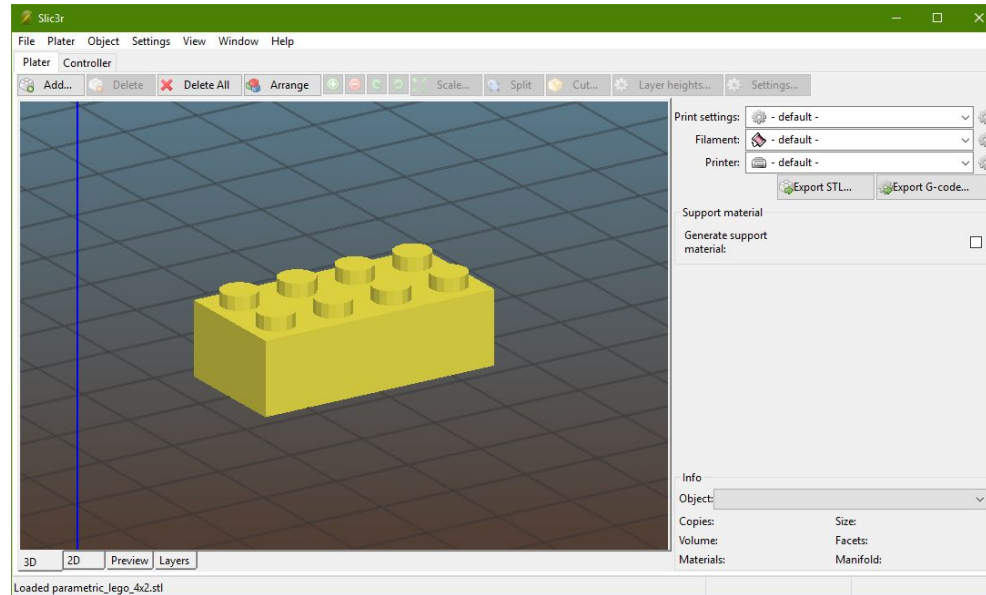
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# 3D Printing Process

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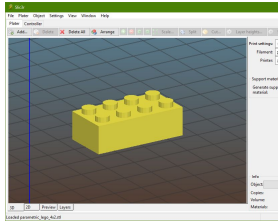
# 3D Print Process: CAD Model

CAD Model - - - - - 3D Object

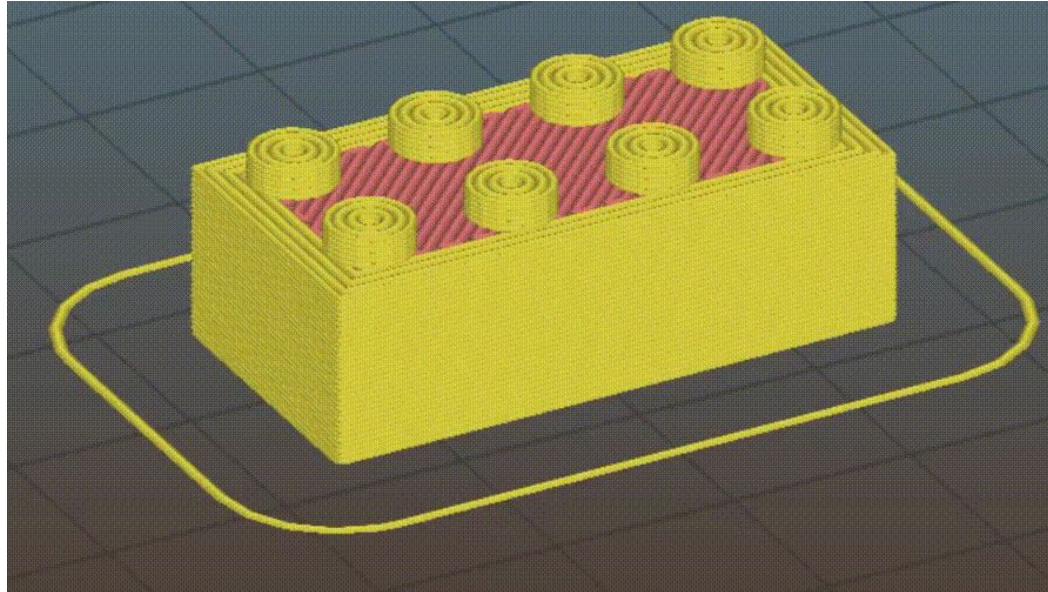


# 3D Print Process

CAD Model - - - - - 3D Object

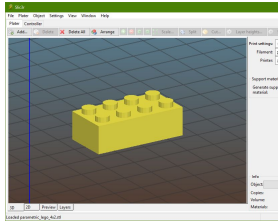


3D Object  
(STL File)

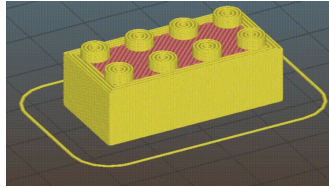


# 3D Print Process

CAD Model - - - - - 3D Object



3D Object  
(STL File)



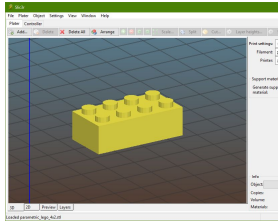
Slic3r  
Software

```
G0 X123.138 Y80.654
G1 X124.247 Y79.545
G1 X124.968 Y79.364
G1 X124.968 Y78.824
G0 Z0.650
G0 X26.050 Y148.950
```

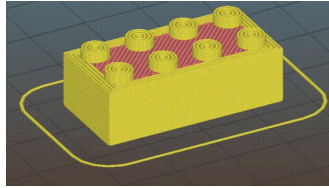
# 3D Print Process

CAD Model

3D Object



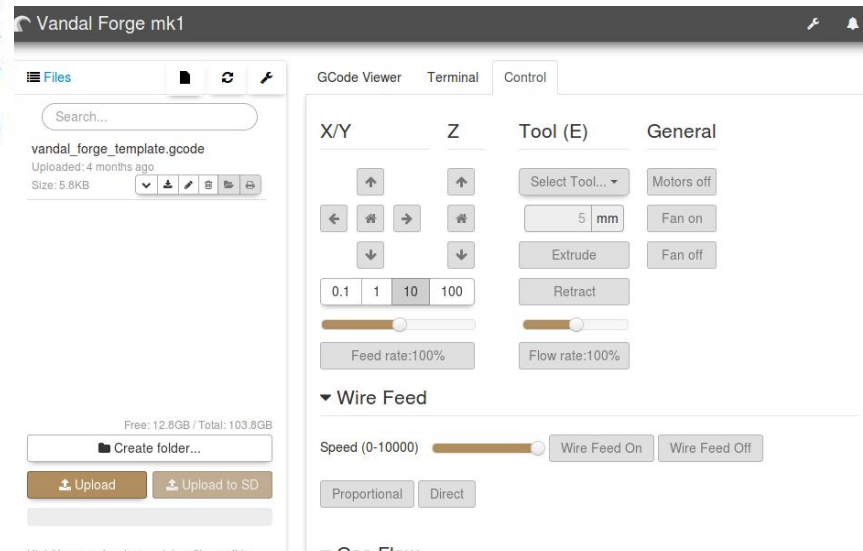
3D Object  
(STL File)



Slic3r  
Software

```
G0 X123.138 Y80.654  
G1 X124.247 Y79.545  
G1 X124.968 Y79.364  
G1 X124.968 Y78.824  
G0 Z0.650  
G0 X26.050 Y148.950
```

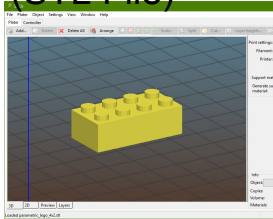
Print  
Instructions



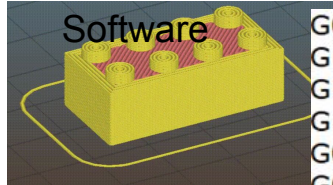
# 3D Print Process

CAD Model - - - - - 3D Object

3D Object  
(STL File)



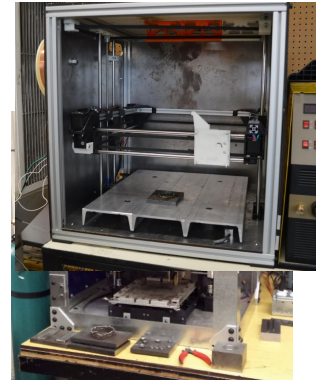
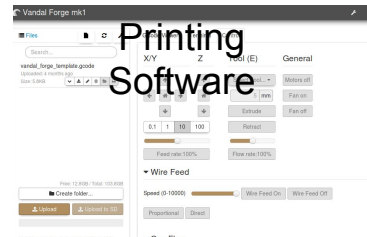
Slic3r  
Software



Print  
Instructions

```
G0 X123.128 Y88.654
G1 X124.247 Y79.545
G1 X124.968 Y79.364
G1 X124.968 Y78.824
G0 Z0.650
G0 X26.050 Y148.950
```

Printing  
Software







Problem

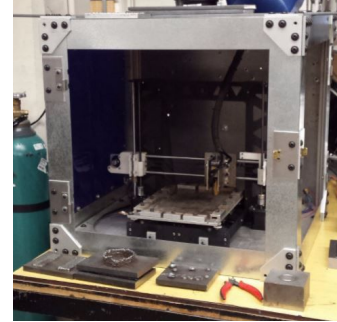
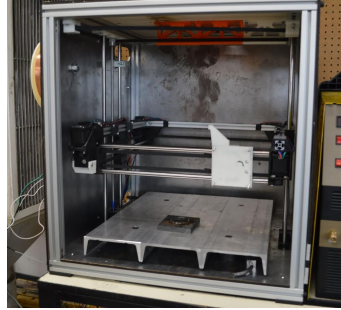
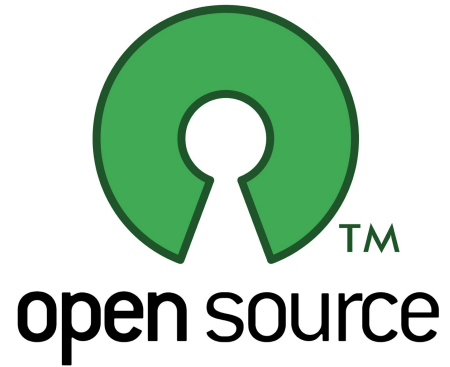
~~Software~~



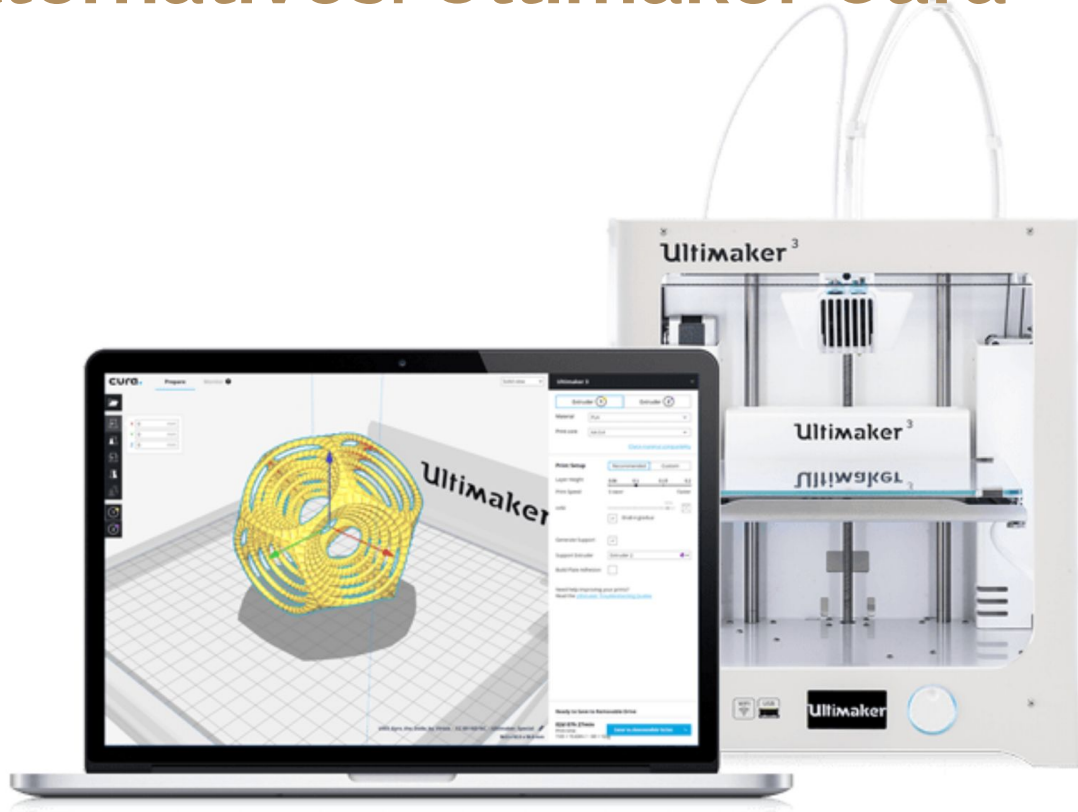
# Objectives

- ☒ Custom Gcode commands
- ☒ Octoprint accepts custom commands
- ☒ GUI's utilize custom commands
- ☒ ForgeWare Integration

# Requirements



# Alternatives: Ultimaker Cura

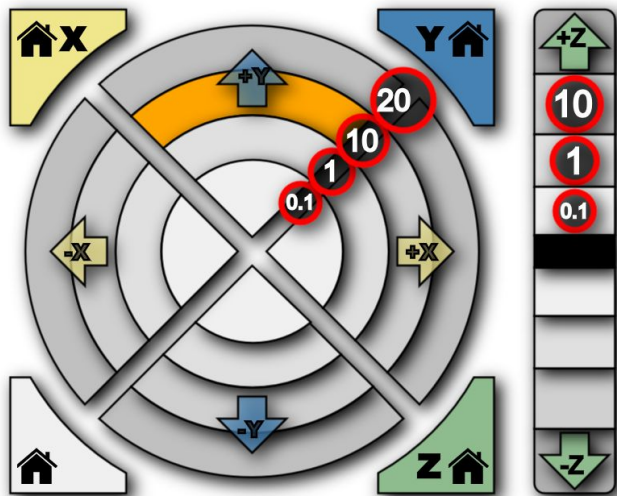




# Alternatives: Smoothieware

Reset\_Smoothie Motors Off Motors On

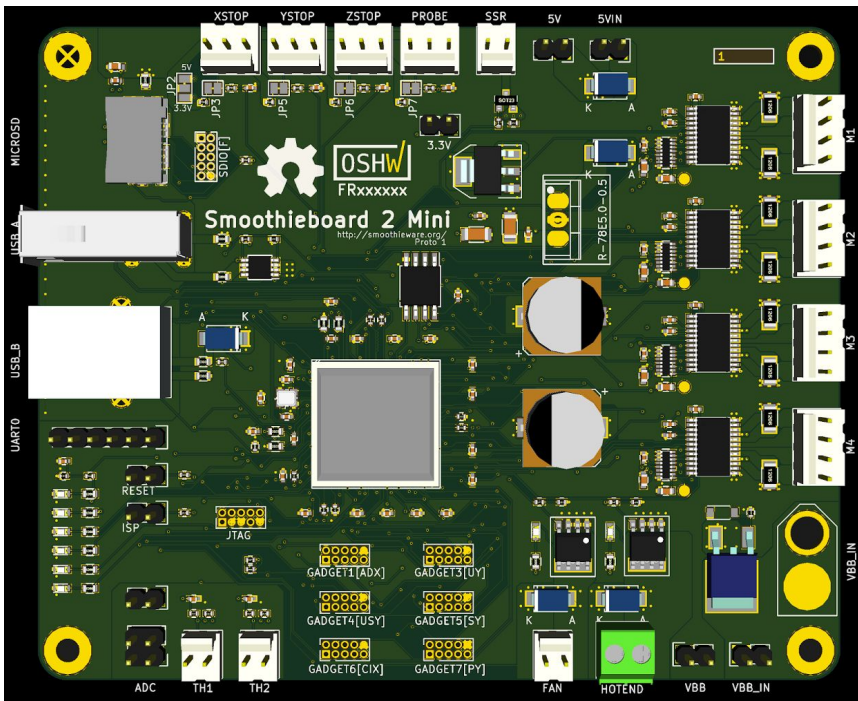
XY: 5000 mm/min Z: 800



Spindle On Spindle Off

XYZ Axis Control

Smoothieware WebClient

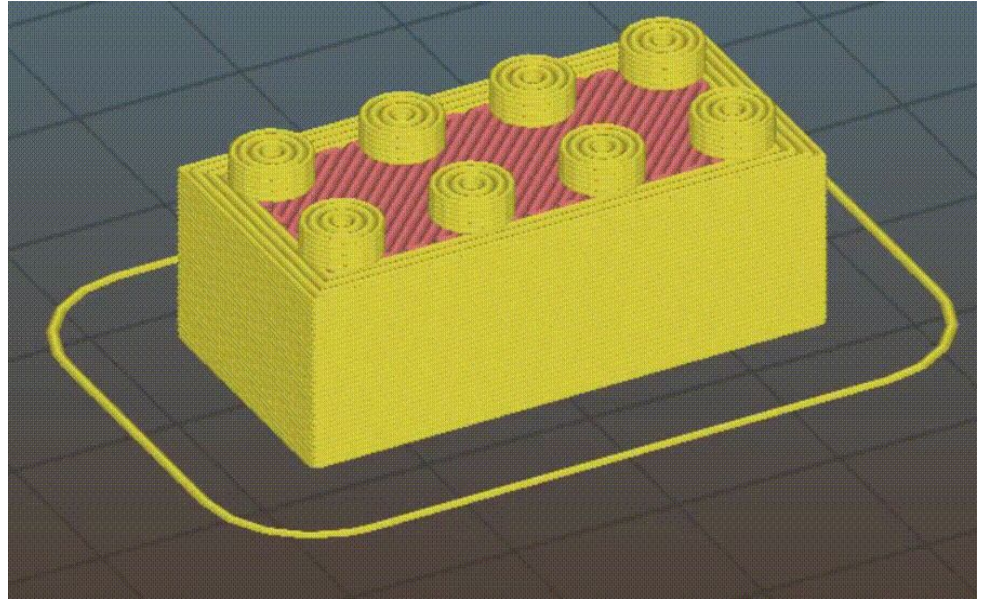
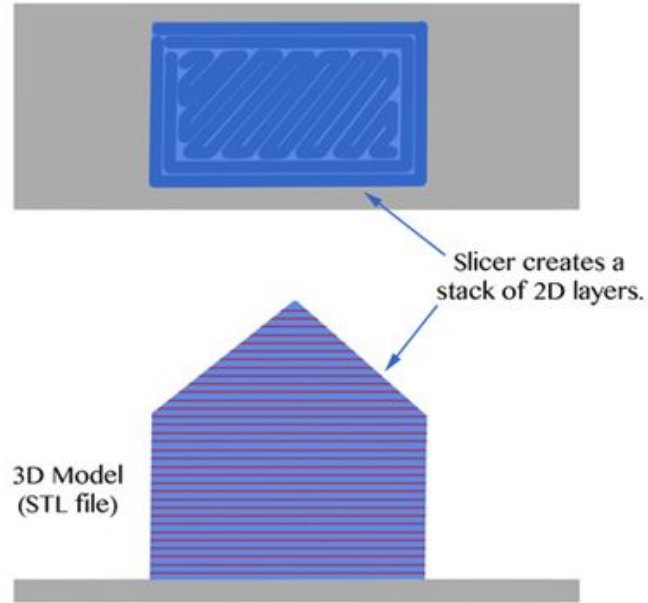


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# Slic3r

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# Slic3r: What it does





# Slic3r - Gcode

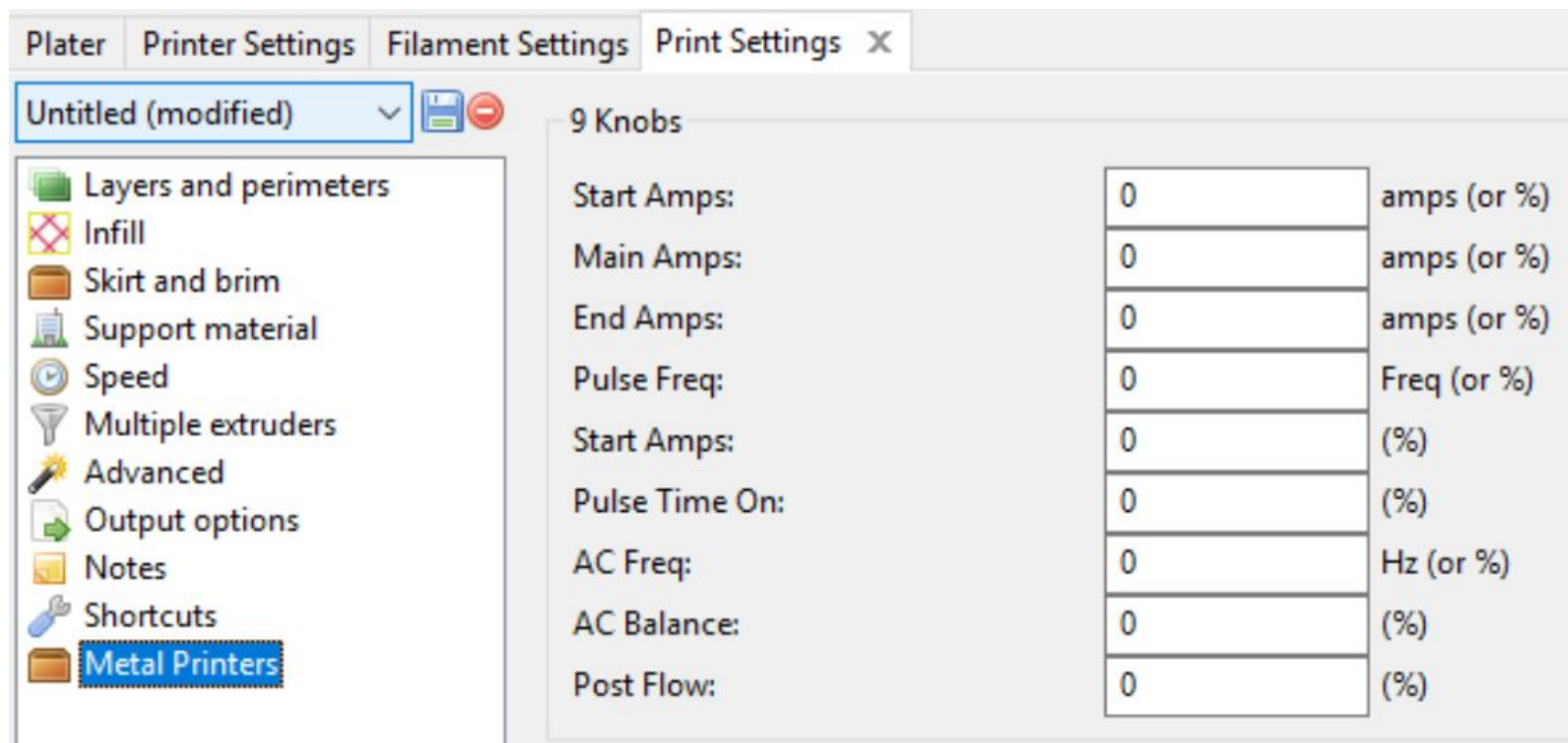
## Original Code

```
G92 E0
G1 Z0.350 F7800.000
G1 E-2.00000 F2400.00000
G92 E0
G1 X19.168 Y41.774 F7800.000
G1 E2.00000 F2400.00000
G1 F1800
```

## Updated Code

```
G0 F3000; set G0 command speed
G1 F200 ; Set G1 Command speed
M770 ; Gas solenoid
G4 S3 ; dwell for 3 seconds
M701 ;Enable temp recording
G0 Z0.350
I10 C1
```

# Slic3r - GUI

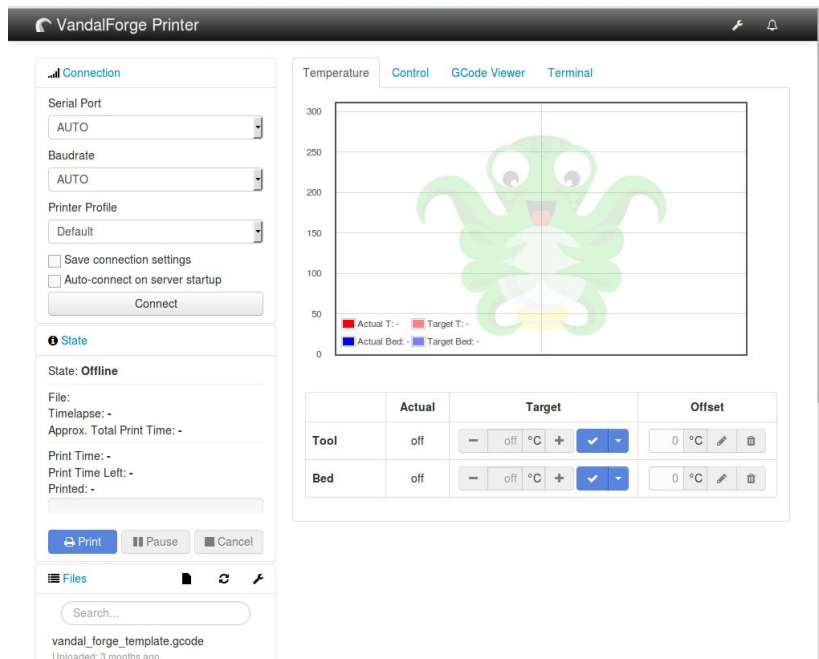


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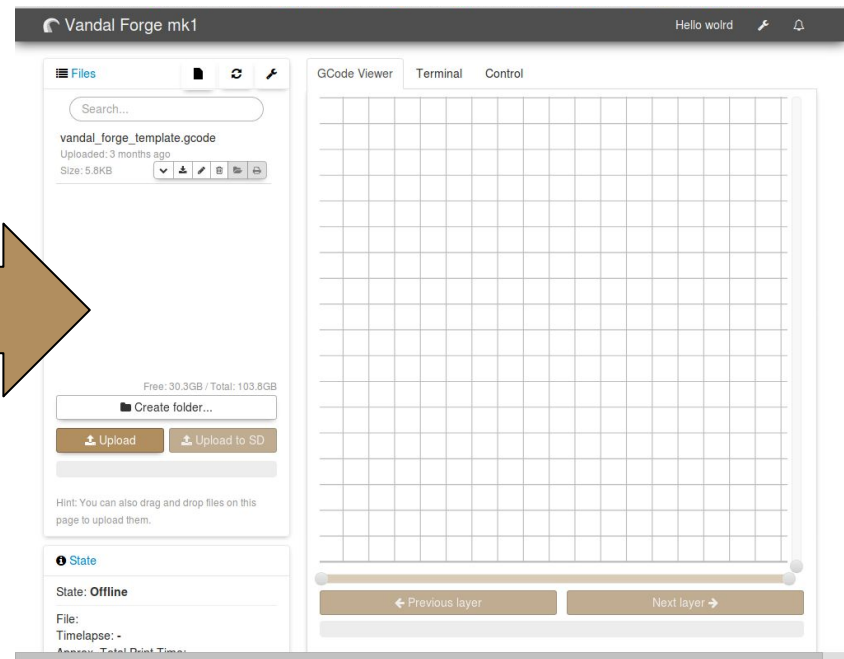
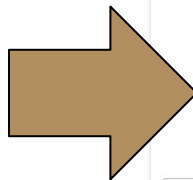
# OctoPrint

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# OctoPrint: Modifications



Old User Interface



Updated User Interface

# OctoPrint: Modifications

▼ TIG Welder Commands (all commands are sent as percentage from 1 -100%)

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Start Amps (10-200A)

Set Start Amps

Main Amps (10-200A)

Set Main Amps

End Amps (10-200A)

Set End Amps

Pulse Frequency (.5 - 10Hz)

Set Pulse freq.

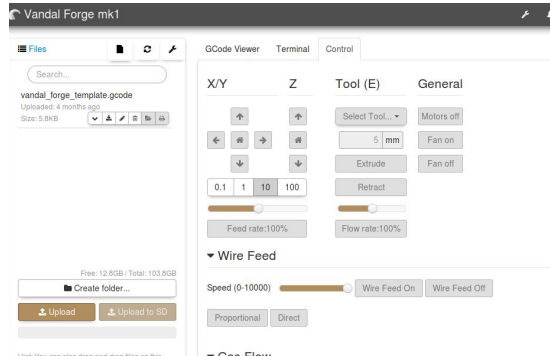
Pulse Amps (10-80%)

Set Pulse amps

# Summary

```
G0 F3000; set G0 command speed
G1 F200 ; Set G1 Command speed
M770    ; Gas solenoid
G4 S3   ; dwell for 3 seconds
M701    ;Enable temp recording
G0 Z0.350
I10 C1
```

Modified GCode Commands



Updated User Interfaces



Created Documentation

# Acknowledgements

**Project Sponsor:** Dr. Michael Maughan

**Project Instructors**

Dr. Michael Maughan  
Bruce Bolden

**Grad Student Advisors**

Matthew Buchanan  
Andre Corpus

VandalForge Hardware Team



Dr. Maughan



Bruce Bolden

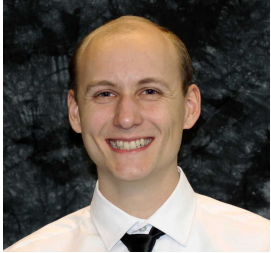
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# Questions?

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# Contact Us



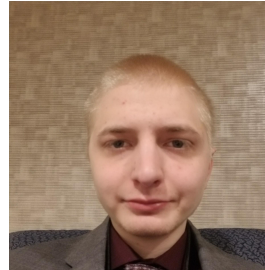
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